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* General, balanced, and negative reciprocity

# Book Review

# The Softer Side of Sociobiology

***Why do people cooperate? Why are we nice to each other? It's all in the genes, a new book claims.***

### H. Allen Orr

**The Origins of Virtue: Human Instincts and the Evolution of Cooperation**  
Matt Ridley  
*Viking Penguin, $24.95*

If you've ever read Sinclair Lewis's *Arrowsmith*, you surely recall Dr. Tubbs. The *ur*-technocrat who understood precious little of the science done in the institute he ran, the vapid Tubbs would pop into a lab just long enough to announce that he was off to yet another conference on teamwork in science. For cooperation, he invariably added, was the next "Real Big Thing in Science." Tubbs was not only a believable character (in a novel desperately short of them), he was a prophetic one. The ratio of Tubbses to Arrowsmiths in science-- of technically clueless hangers-on to those who sit before a lab bench--has grown ever more lop-sided since Lewis's time.

But Tubbs was prophetic in another way too. Cooperation, it seems, *was* the next Real Big Thing in Science. As it turns out, an army of evolutionary biologists, evolutionary psychologists, economists and political scientists have descended on the problem of why animals--and especially humans--cooperate. And why not? To anyone schooled in modern evolutionary biology, cooperation must seem a bit puzzling. For decades now we've been told that genes are selfish and that we, as organisms, are mere "survival machines" created by relentlessly self-serving strands of DNA to ensure their own persistence. But if genes are so selfish, why aren't survival machines? Why do animals, and especially humans, so often work together? Why do we share food, tithe, hunt in groups, build hospitals, become priests, serve in armies, and preach a morality that emphasizes above all the importance of selflessness?

In his latest book, Matt Ridley, former American editor at the *Economist* and one-time zoology student at Oxford, surveys the efforts over the last half-century to answer this question. A question, as Ridley emphasizes, that involves nothing less than the origin of virtue. For what we mean by virtue is inextricably bound up with selfless, cooperative acts--what Ridley calls "groupish" behavior. The result of his labors, *The Origins of Virtue*, is a gentle introduction to evolutionary biology and game theory, with a few glances at anthropology, economics and psychology along the way. The book, like Ridley's last one, *The Red Queen*--which was nominated for a RhÙne-Poulenc Prize and a Writers' Guild Award--will surely get a good deal of attention.

Given that Ridley aims his book at a lay audience, he's set himself a hard task. A survey that wanders over so much turf demands a good editorial eye as well as an ability to pitch quantitative arguments in plain English. As a writer Ridley mostly rises to the challenge. He explains subtle ideas in prose that is remarkably free of jargon and needless detail. But as a critical thinker, someone who serves as a skeptical guide to a literature, Ridley falls short. While this is always bad it's particularly worrisome when dealing with cooperation. For this is one of those literatures that's riddled with exaggerated, contradictory and half-supported claims. One of those places, in other words, where one most needs the services a synthesist who aims for a balanced portrait, one that subtly adjusts for the inflated claims of enthusiasts. When surveying a field for the lay reader, it is, to a good extent, an author's ability to strike this equipoise that determines whether his book falls into the camp of serious, judicious works or into the camp of mere cheerleading. Ridley's book, alas, lands squarely amidst the pom-poms.

Ridley's main claim is straightforward enough: The cause of cooperation is sociobiological. "Society works not because we have consciously invented it, but because it is an ancient product of our evolved predispositions. It is literally in our nature." This should not, I suppose, come as any surprise since according to Ridley "always, without exception, living things are designed to do things that enhance the chances of their genes or copies of their genes surviving and replicating." And if this is too vague for you, Ridley lays his thesis out in terms that are about as unambiguous as you can get:

It is the claim of this book that the answer to an old question--how is society possible?--is suddenly at hand, thanks to the insights of evolutionary biology. Society was not invented by reasoning men. It evolved as part of our nature. It is as much a product of our genes as our bodies are.

This is a big claim and any reader of these words expects to hear about a pretty darned amazing discovery in evolutionary biology. The answer is, after all, suddenly at hand. But as the reader turns the pages, he gets more than he bargained for. For as soon as he's told about one answer, he's treated to yet another. In the end, so many answers are suddenly at hand that one feels a desperate shortage of hands. We are treated to Trivers's theory of reciprocity, Frank's commitment model, Boyd and Richerson's conformity model, Hawkes's social attention theory, and so on. The problem is that these ideas don't necessarily work together and Ridley's efforts at synthesis are less than heroic.

Though it's hard to get a fix on just what Ridley thinks the New Theory of Cooperation looks like, this much is clear. The sociobiological theory of reciprocity--roughly, I'll be nice to you if you're nice to me--forms its centerpiece. Reciprocity, at any rate, comes as close to a unifying theme as you'll find in Ridley's inchoate book. It is this claim, then, that's worth thinking hard about: Evolutionary biology and especially the genetic theory of reciprocity have made clear why we are virtuous. As we'll see, there are at least three major problems with this idea. For one thing, the theory of reciprocity suffers both theoretical and empirical woes. For another, it turns out to be quite hard to distinguish Ridley's biological theory from the cultural alternatives he so despises. And last, much that Ridley brands human cooperation may have little or nothing to do with reciprocity anyway. Though these problems certainly don't demand a rejection of Ridley's view--he could, after all, be right--they do something almost as important. They remind us that the origins of human virtue remain far from certain.

## Don't Worry, Be Happy

Ridley starts his story where the science of cooperation itself began--game theory and the Prisoner's Dilemma. Because this dilemma plays a key role in the history of cooperation, it's important to understand just what it does and doesn't show.

Here's the scenario. You and a partner in crime are separately questioned by the police. If you both keep your mouths shut (cooperate) you'll both get away with light sentences (say, one year). If you both rat on each other (defect) you'll both get modest sentences (three years). But if you rat on your naively cooperating pal, he gets stuck with all the blame and does five years, while you go free. The converse holds if he rats on you. The trick is that you don't know what your partner will do. The Prisoner's Dilemma captures a tension that runs through certain social situations. Is it best to work with others toward some common good (light sentences) or to selfishly cheat in the hope that everyone else doesn't cheat too? Note that if everyone cooperates we're all better off than if everyone defects. So it might seem that cooperation is easy, the obvious choice. But we can't of course assume that everyone *will* act in the same way. Indeed if you think about it, you'll see that *no matter what your partner does*, you end up with a lighter sentence if you defect. Defection therefore--not cooperation--is the best strategy.

The Prisoner's Dilemma was first worked out formally by Merril Flood and Melvin Dresler of the Rand Corporation in 1950. Thus, early on, the new science of game theory preached a bleak sermon. As Ridley puts it, it showed "not only that it was rational to defect but also that it was stupid of people not to realize this." Worse, the result of this rational behavior is the opposite of that expected under Adam Smith's invisible hand: individual agents, acting rationally, end up worse off than they might have been.

This remained the received wisdom for three decades. But then something rather remarkable happened. Robert Axelrod, a political scientist, and W. D. Hamilton, an evolutionary biologist, teamed up in 1981 to show that the always-defect gospel rests on a shaky assumption--that any two players meet but once. In the real world people from the same village may well meet over and over again. What *then* is the best strategy? The answer revealed that the confident claims of game theory had misled. As it turned out, it's best to be nice. A strategy known as tit-for-tat, which is far more civil than always-defect, proved superior. Tit-for-tat always starts out nice (it never defects first) and though it quickly retaliates for a partner's defection it doesn't hold a grudge: it forgives ancient defections and cooperates as long as its partner played nice at their last rendezvous.

Now none of this is particularly genetical. But in 1971, Robert Trivers showed that such "reciprocity" could evolve by natural selection. He showed, in other words, that a gene that says "cooperate with those who cooperate with me" can maintain itself at high frequency[1](http://www.bostonreview.net/BR22.5/orr.html#1). As long as individuals have the brainpower to keep track of who's naughty and who's nice and so cooperate only with those who cooperate back, Trivers's theory of reciprocal altruism showed that tit-for-tat-like behavior can evolve. Moreover once reciprocity is common it resists invasion by any mutant strategy. Tit-for-tat is therefore an "evolutionarily stable strategy." Trivers held up reciprocity as a general Darwinian account of cooperation, pointing to examples in fish, shrimp, birds, and, of course, people.[2](http://www.bostonreview.net/BR22.5/orr.html#2)

It would be hard to exaggerate the significance of the Trivers-Axelrod-Hamilton work for sociobiology. Reciprocity forms the centerpiece of the Darwinian view of cooperation. The reason for all the attention is clear: for while Trivers showed that reciprocity could evolve, Axelrod and Hamilton showed that tit-for-tat is the best strategy.

Or is it? As it turns out, tit-for-tat may not be the holy grail after all. For one thing, tit-for-tat turns out not to be an evolutionarily stable strategy. Indeed recent theory shows that there *is* no solution to the repeated Prisoner's Dilemma that's evolutionarily stable; in fact, tit-for-tat and nasty strategies like always-defect can coexist in a population.[3](http://www.bostonreview.net/BR22.5/orr.html#3) Recent work has also found situations in which tit-for-tat simply loses and newer, more exotic, strategies win. Last, many of these problems grow more severe when considering what is, after all, the socially relevant problem: cooperation among many players, not two.

But these theoretical worries pale in comparison to the empirical problems besetting tit-for-tat. Animals just don't seem to do it. With a few exceptions, experiments have simply failed to find tit-for-tat--or any related form of reciprocity--in nature.

The strange thing is that Ridley admits all this. To his credit, he makes no attempt to hide these theory problems nor the lack of evidence for reciprocity. He just refuses to have the sort of reaction to it that you'd expect. His enthusiasm, his utter confidence that "the insights of evolutionary biology" have cracked the problem of "how society is possible" remains unshaken. This is surely the strangest thing about Ridley's book. There's a bizarre disconnect between his reportage of often troubling facts and his relentlessly upbeat attitude about them. To say that he's assured or undespairing is a colossal understatement. Here, for example, is how he rhapsodizes about his favorite dilemma: the Prisoner's Dilemma, he gushes, led the way to "one of the most exciting discoveries of recent years: nothing less than an understanding of why people are nice to each other." This despite the above long litany of worries.

And here's his stubbornly optimistic reaction to the news that animals don't do reciprocity: "The fact that other animals do not often play Tit-for-tat does not prove that human beings do not build their societies upon reciprocity." While this kind of logic does little to inspire confidence in his most-exciting-discovery-of-recent-years, Ridley really throws the reader for a loop when he spins the lack of evidence for reciprocity as some sort of good news. Reciprocity, it turns out, just might be what makes us humans so special:

[H]uman beings, with their astonishing ability to recall the features of even the most casual aquaintance and their long lives and long memories, are equipped to play optional prisoner's dilemma games with far greater aplomb than any other species. Of all the species on the planet most likely to satisfy the criteria of prisoner's dilemma tournaments . . . human beings are the most obvious. Indeed, it might be what is special about us: we are uniquely good at reciprocal altruism.

Ridley's irrepressible optimism, his breathless hyperbole, is perhaps understandable. He is a writer of popular science and such persons undoubtedly feel great pressure to move books off shelves. It is no secret that one way to do this is by gushing about big new breakthroughs. The result, unfortunately, is all too often something akin to a book-length jacket blurb.

## Genes, Brains and Culture

We have been assuming, with Ridley, that cooperation has a genetic cause. And there's a good reason for taking this idea seriously: non-genetic explanations won't fly in most species. Moral codes have little to do with the altruism of sterile ants who daily slave away to provision their queen. One might argue, then, that a genetic theory of cooperation has two things going for it: it is parsimonious and it is general. This of course explained, and legitimately so, a good deal of the allure of Trivers's theory. It offered a general explanation.

But it was not to be. And now Ridley informs us that reciprocity may hold with full force only in *Homo sapiens*. This revelation has two consequences. One is that much of what made the Darwinian theory of cooperation initially so attractive has evaporated. The whole history of Darwinism has been characterized by an incorporation of man--a creature who once seemed impossibly unique--into larger, more general, classes of explanation. Reciprocal altruism was to be the next, social, chapter in a book including uncontested ones on physiology, genetics, and evolution. But Ridley now leaves us holding a theory that is neither general nor parsimonious. Humans might do reciprocity but, contrary to Trivers, lions don't.

To see the second consequence, re-read the above humans-are-the-best-at-reciprocity quotation. Note that the same feature that leaves humans uniquely well-suited for evolving reciprocal altruism--big brains--also leaves us uniquely well-suited for creating culture. And here we arrive at the most serious problem plaguing Ridley's book. The notion that the roots of human virtue may be *cultural* gets short shrift.

It takes no particular imagination, after all, to think that man, a creature sporting a culture infinitely richer than those of our furred, finned and feathered brethren, plays by different rules. We, but perhaps not they, can act more or less independently of our genes. Indeed our culture might be potent enough to encourage behavior that is mildly or even strongly maladaptive (sharing food, squandering resources on pets, becoming celibate). And maybe, just maybe, virtue is one of these abiological, un-naturally-selected characters arrived at not by genes, but by hard-won experience of what does and doesn't work in human society. Maybe, in other words, society reflects the experiences, aspirations and compromises of reasoning men, as the humanists said all along.

Now this cultural hypothesis might well be wrong. But how do we rule it out? More to the point, how did Ridley rule it out? He, after all, is the one who told us that "[s]ociety was not invented by reasoning men."

The answer is that he didn't. Indeed Ridley's humans-only argument makes it far *harder* to distinguish the genetic and cultural possibilities. For the features needed to evolve reciprocity have converged dangerously close to those characterizing the humanist's "reasoning man." Ridley seems utterly oblivious to this problem. One result is that he's forever acting as though any sign of scorekeeping in people--tallying who's nice and who's not, or who owes what to whom--is evidence for the theory of reciprocal altruism. But this is absurd. The question isn't whether people are good at reciprocity, at keeping track of obligations. *Of course* we are. The question is whether such behavior reflects *genes* for reciprocity, for tit-for-tat-like behavior, that raced through humans by natural selection.

Now one could get carried away here. Evolution obviously explains why humans have big brains and so ultimately it's our genes that allow us to think, speak and shake hands. But no sane person contests this. Any culturalist admits that biology has something to do with why people have culture and rocks do not. But the Darwinian theory of virtue goes much further than this. Its claim is much stronger and more specific. As Ridley puts it:

We do not need to reason our way to the conclusion that `one good turn deserves another', nor do we need to be taught it against our better judgements. It simply develops within us as we mature, an ineradicable predisposition, to be nurtured by teaching or not as the case may be. And why? Because natural selection has chosen it to enable us to get more from social living.

Reciprocity and its cousin virtue are "an inevitable part of our natures: an instinct."

It is this claim--the only one that's not trivial and the only one that's worth writing a book about--that Ridley fails to prove. It is one thing, after all, to show that our practices depend on biology (you can't watch TV without a nervous system), quite another to prove that biology *explains* our practices (there are genes for watching *Seinfeld*).

My point is not that Ridley must be wrong. Genes for reciprocity may well have swept through our ill-mannered ancestors sometime in the antediluvian past. I just don't know. But neither does Ridley. His extravagant claim that biologists now know "why people are nice to each other," that niceness is an inherent part of our nature, "an ineradicable predisposition," is nonsense, words unsupported by anything that might get mistaken for hard data. Ridley can point to the fact that humans keep score, cooperate, and remember who's nice to whom until he's blue in the face. But none of this nails down the etiology of virtue. The fact that I have a receipt in my pocket shows that people are good scorekeepers but it tells me nothing about the genetic basis of scorekeeping.[4](http://www.bostonreview.net/BR22.5/orr.html#4)

Ridley doesn't seem to get this distinction. He seems to think that, because one can write down a genetic theory of reciprocity and because people engage in a good deal of reciprocity, that *therefore* human cooperation must be genetic. One needn't be a die-hard Popperian to think this scientific logic leaves a bit to be desired.

But forget this subtle stuff. Ridley leaves himself open to two standard objections to sociobiological claims. First, if it's all in the genes, why do people spend so much time pounding virtue into the heads of children? Human beings are, as a lot, pretty good at knowing what they *don't* need to do. No one wastes time teaching kids to laugh, yawn, throw temper tantrums, or, later, obsess over what lurks beneath the clothes of their peers. So why the virtue industry? Why so many churches, priests, judges, rabbis, probation officers and good citizenship certificates? My guess is that--despite Ridley's instinct talk--it's because the results of insufficient proselytizing are all too obvious. The world is full of kids who'd need several encounters on the road to Damascus before ascending to the moral heights of tit-for-tat.

Second, if it's all in the genes, why do different people preach such different brands of virtue? No matter which you find more laudable, there's no way to make the chasm between "an eye for an eye" and "turn the other cheek" disappear. These reflect profoundly different notions of virtuous behavior and at least one strongly departs from tit-for-tat. At the risk of being pedantic, I note that both notions arose within the same genetic stock.

The point of all this isn't that I'd be horrified to learn that virtue is in the genes. Far from it. There's something downright attractive about the idea, a speck of good news amidst the usual lugubrious pronouncements of sociobiology. The point is that, under an avalanche of pop Darwinism and evolutionary psychologizing, we've grown accustomed to thinking that every act, every attitude *must* have a Darwinian cause (to see how far this has gone, dig up David Denby's essay in the July 21 issue of *The New Yorker*). There is a new cant out there and it is a kind of social Darwinism. And as with all cant, plausible alternatives begin to slip from sight. It begins to seem unrespectable, almost unprofessional, to suggest that some behavior might have a cultural origin--even in a case like Ridley's where the genetic and cultural possibilities are so close. But surely it is the lowering of standards of evidence to such unheard of depths that is truly worrisome and that legitimately invites charges both of unrespectable and unprofessional.

## The Prisoner's Dilemma Dilemma

Even if you buy a genetic theory of cooperation, Ridley may be hawking the wrong flavor. For I suspect the Prisoner's Dilemma and reciprocity fail to capture much of what Ridley brands cooperation. But you needn't take my word for it. Ridley is in the awkward position of having had a scholarly book on cooperation[5](http://www.bostonreview.net/BR22.5/orr.html#5) appear simultaneously with his. Though I don't want to give the impression that its author, Lee Dugatkin, agrees with me, it's interesting to compare the books. There are two big differences. The first is tone. While Ridley is cocksure, proclaiming breakthroughs and a new view of man, Dugatkin is cautious, emphasizing difficulties and controversy. Though this difference is partly inevitable when comparing popular and scholary works, it is, in the present case, so extreme that one walks away with different impressions of the state of the art. But it's the second difference that's important. For Dugatkin argues that sociobiologists may be barking up the wrong tree. He suggests that the historical obsession with reciprocity may be beside the point.

In the Prisoner's Dilemma, it's best to cheat when playing a single game. But as Dugatkin points out, in many situations it's in everyone's individual interest to *cooperate*. I need to hunt for food whether you're around or not; ditto for you; but if we hunt together we may do better *per capita* than if we hunt alone. In such cases, defectors lose out and cooperation makes sense. There's no dilemma and there's no need for a theory of reciprocity. Dugatkin argues that this notion of "byproduct mutualism" or "no-cost cooperation" may be more important than reciprocity. Indeed at the close of his book he argues that sociobiologists have fixated on reciprocity for rather silly reasons and asks a hard question: "[D]oes the skew toward reciprocity in the theoretical literature represent what is happening in nature? . . . My guess is that, in the long run, the answer will probably be a resounding `No.'"[6](http://www.bostonreview.net/BR22.5/orr.html#6) Remarkably, Ridley never mentions this alternative theory of cooperation.

Dugatkin does, though, seem to think reciprocity remains plausible for humans. (He only hints at this--he perhaps wisely eschews the human literature.) Here I'm tempted to part company with him. For humans seem to me one of the most obvious places where groupish behavior arises in circumstances that look nothing like those assumed in the Prisoner's Dilemma. What Ridley would herd under the rubric of human cooperation includes an enormously complex mix of power arrangements and strategies.

It's easy to forget, in a haze of tit-for-tat strategizing, that most humans labor together in circumstances where "cooperation" is more or less *forced*. The behavior looks just like the stuff Ridley is so fond of: individuals work together toward some common goal, whether launching Sputnick, paying taxes, building Fords, or fighting wars. But the arrangement of power, the calculus of motive, often differs from that assumed in the Prisoner's Dilemma.[7](http://www.bostonreview.net/BR22.5/orr.html#7) Even in a *single round* of some human games, it doesn't pay to cheat and reciprocity is beside the point. Does anyone think that factory workers "cooperate" to build cars because of reciprocity? People sweat on assembly lines because if they don't--if they defect--the consequences are worse. Gone is the apartment, gone is the car, and, experience suggests, gone is the girlfriend. Similarly why don't soldiers always cheat, deserting while their buddies go over the top? The answer is undoubtedly complex, but the fact that everyone knows what happens to deserters surely has something to do with it.

The point is that humans are extremely adroit at creating social mechanisms--from ostracism to execution--that coerce "cooperation." Indeed in many of the contexts in which real human beings collectively labor, the very word "cooperation" takes on an almost Orwellian cast. One may as well speak of the cooperation of parties to a chain gang.

Now I doubt this sort of thing, this marriage of collaboration and thuggery, happens often in non-humans. But there's a reason for that. The elaborate network of penalties that enforces so much human collective behavior is palpably a product of "reasoning men." We with our big brains have cooked up a culture rich in generals, judges, draft boards, the IRS, cops, CEO's, dictators, and accountants. When turning their sights on humans, sociobiologists ignore such political realities at some peril.

## The Politics

But Ridley reveals that the new science of cooperation teaches a few political lessons of its own. In case you were wondering, Science has proved that big government is bad, free trade good, and inheritance tax at best dubious. Unless the names Reagan and Thatcher don't ring a bell, this presumably all sounds familiar. I must confess that I've never encountered a writer whose science so happily coincides with his political views. Throughout his book, Ridley drops some hints that he's a fairly conservative sort of fellow and his last chapter finally makes it clear why: conservatism is just good science.

In fairness, I should say that Ridley devotes only a few pages of his book to politics and that these are prefaced by a sensible warning about how easily one can slip into the trap of thinking that science translates readily into politics. But this is followed by a humble admission that the "new `gene-tilitarian' understanding of human instincts" might be able teach us a thing or two about political philosophy after all. Ridley, I fear, is being far too modest. As it turns out, the new gene-tilitarian view makes all kinds of recommendations:

If we are to recover social harmony and virtue, if we are to build back into society the virtues that made it work for us, it is vital that we reduce the power and scope of the state. That does not mean a vicious war of all against all. It means devolution: devolution of power over people's lives to parishes, computer networks, clubs, teams, self-help groups, small businesses--everything small and local. It means a massive disassembling of the public bureaucracy. Let national and international governments wither into their minimal function of national defence and redistribution of wealth (directly--without an intervening and greedy bureaucracy). Let Kropotkin's vision of a world of free individuals return. Let everybody rise or fall by their reputation. I am not so naive as to think this can happen overnight, or that some form of government is not necessary. But I do question the necessity of a government that dictates the minutest details of life and squats like a giant flea upon the back of the nation.

Now even if you agree with all this, you may be a tad unclear how the science of cooperation led Ridley to conclude that what the world needs right now is less government and more self-help groups. The argument is . . . well, frankly, I'm not sure what the argument is but it's got something to do with that "everything small and local" bit. One of the problems plaguing tit-for-tat is that, as the number of players goes up, it gets harder to evolve cooperation. It's easier for nice guys to win when each has the luxury of getting to know, and building trusting relationships with, a handful of other players. Ridley takes this reputation problem very seriously. The result--I think--is that he feels big operations involving lots of people are bad. Not enough trust, not enough everybody rising and falling by personal reputation. *Ergo*, big government is bad.

I guess there's a logic there. The trouble is it doesn't get applied very evenly. For earlier in his book, Ridley reveals that he's a big fan of free trade and especially of international trade. But businesses obviously face many of the same trust problems as government. How can MasterCard be sure I'll pay my bill next month? Maybe, reading Ridley, they'll decide to deal only with those folks they know personally. They can do business with the same players over and over again, all of whom will rise or fall by personal reputation. The good people at MasterCard will surely sleep better knowing they're dealing with four or five proven customers. Similarly why is international trade so swell? The more companies and countries any business deals with, the greater the trust problem. Why not deal with a couple companies in your own neck of the woods, "everything small and local"?

The point is that business has found ways to more or less solve the trust problem. For one thing, MasterCard doesn't have to try to remember if I pay my bills. They have computers that'll do all the remembering you could want (and more). Other computers then cook these kinds of data into credit ratings. This electronic proxy for personal reputation seems to work pretty well.[8](http://www.bostonreview.net/BR22.5/orr.html#8) The point is that the advantages of big scale sometimes swamp the manageable disadvantages of not having access to personal reputations.

Ridley somehow fails to see that the same sorts of solutions are often open to government. As a result, the advantages of action at a national scale--interstate highways, Centers for Disease Control, Federal Aviation Authority--may outweigh whatever lapses in trust result from the players involved not all knowing each other.

It would be fatuous, of course, to argue that big is always better. There are clearly situations where it's best to devolve control to smaller units of government (or to self-help groups, for that matter). But the notion that Congress and Parliament must go, that science mandates a "massive disassembling" of this, that and the other is absurd. Ridley has applied the lessons of cooperation research--such as they are--in such idiosyncratic ways that his political dispensations are rendered nonsense. It may be time for the giant flea of big government to dismount, unburdening the back of the nation. But don't let Ridley try to tell you that Science said so.

1 None of this depends on individuals being closely related; for example, Trivers's theory of reciprocal altruism doesn't rely on kin selection. It requires only that the benefit to the recipient of any altruistic act be greater than the cost to the altruist.

2 "[T]he above model for the natural selection of reciprocally altruistic behavior can readily explain the function of human altruistic behavior and the details of the psychological system underlying such behavior." See Robert L. Trivers, "The Evolution of Reciprocal Altruism," *Quarterly Review of Biology* 46 (1971): 35-57.

3See Robert Boyd and Jeffrey P. Lorberbaum, "No Pure Strategy Is Evolutionarily Stable in the Repeated Prisoner's Dilemma Game," *Nature* 327 (1987): 58-59, and Joel R. Peck, "Friendship and the Evolution of Co-operation," *Journal of Theoretical Biology* 162 (1993): 195-228.

4Note that scorekeeping may well be the best of all strategies, a legitimate insight of game theory. But it doesn't follow that humans arrived at this strategy by a genetic route.

5Lee A. Dugatkin, *Cooperation Among Animals: An Evolutionary Perspective* (New York: Oxford University Press, 1997).

6 Dugatkin, *Cooperation,* p. 167.

7 I do not simply mean what is sometimes referred to as "psychological calculus." I mean the actual payoff matrix differs from that assumed in the Prisoner's Dilemma.

8 Or to make the problem one among equivalent "players," how do I know that everyone else is paying their MasterCard bills? Maybe the company routinely lets 10 percent of their customers get by without paying and I'm footing more of their expenses than I should. How can I trust all these other players, millions of whom I don't know? Same reason--somebody is keeping electronic score.

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